COVID-19 online medical consultation in China: A discourse analysis perspective

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Abstract

During the outbreak of COVID-19, many online medical consultation (OMC) platforms in China set up a section for the public to consult with doctors about COVID-19 disease. The COVID-19 related medical consultation discourse is extremely understudied from the perspective of discourse analysis. From a discourse analysis perspective, this paper examines the COVID-19 OMC texts which were collected from widely used Chinese e-healthcare Apps. Adopting content analysis and sequence analysis, the current paper addresses three questions: (1) what are thematic features of the COVID-19 OMC inquirers' messages; (2) what are thematic features of the doctors' messages, and (3) what are the sequential features of the inquirer-doctor interaction? Interestingly, the study finds that the COVID-19 OMC discourse frequently sees communicative communication in both the doctors' messages and the inquirers'. In addition, there is general medical consultation as well as COVID-19 related consultation in the COVID-19 OMC discourse. Findings of this study can facilitate a better understanding of COVID-19 OMC discourse and provide implications regarding public health communication and popularization of science in relation to emerging infectious disease.

Keywords: COVID-19 online medical consultation, doctor-patient communication, e-healthcare, discourse analysis, China.

Résumé

La consultation médicale en ligne liée à la COVID-19 en Chine : une perspective d'analyse du discours

Lors du déclenchement de la pandémie de COVID-19, de nombreuses plateformes de consultation médicale en ligne en Chine ont mis en place une section pour que le public consulte des médecins sur la maladie de COVID-19. Le

discours des consultations médicales liées à la COVID-19 a été très peu étudié sous l'angle de l'analyse du discours. Cet article propose une analyse du discours de textes issus de ces consultations, qui ont été collectés à partir d'applications de soins de santé en ligne largement utilisées en Chine. Plus précisément, cet article adopte une approche combinant l'analyse de contenu et l'analyse des séquences. Trois questions principales y sont abordées : (1) quelles sont les caractéristiques thématiques des messages des patients lors des consultations médicales en ligne liées à la COVID-19 ?, (2) quelles sont les caractéristiques thématiques des messages des médecins ?, (3) et quelles sont les caractéristiques séquentielles de l'interaction entre les patients et les médecins ? L'étude révèle que, dans les consultations médicales en ligne liées à la COVID-19, la communication communicative est fréquente, aussi bien dans les messages des médecins que dans ceux des patients. Par ailleurs, il y a de la consultation médicale générale, ainsi que de la consultation liée à COVID-19. Les résultats de cette étude permettent une meilleure compréhension de ce type de discours et présentent des implications pertinentes pour la communication en santé publique et la vulgarisation scientifique face aux maladies infectieuses émergentes.

Mots-clés: consultation médicale en ligne liée à la COVID-19, communication médecin-patient, e-santé, analyse du discours, Chine.

1. Introduction

Online medical consultation (OMC) has an increasingly important role to play, especially in times such as the pandemic, when access to medical facilities was difficult. OMC can be a key platform to prevent and control infectious diseases (Strymish et al., 2017). In fact, it was given more attention during the pandemic as a way to prevent cross-infection or to implement social distancing rules (Huang et al., 2021). It has been found that e-consultation can be as good as in-person consultation in terms of clinical outcomes in infectious disease (Burnham et al., 2019). However, infectious disease (ID) consultation in an online context is extremely understudied from a discourse analytical perspective.

COVID-19 related studies, in the field of humanities and social science, mainly focus on emergency information management, use of COVID-19 apps, use of information sources related to COVID-19, social media usage behavior, social media discourse in relation to COVID-19, COVID-19 vaccine discourse, and identity issues (Chou, 2020; Goggin, 2020; Ho, 2020; Lee, 2020; Lupton & Lewis, 2021; Scannell et al., 2021; Ye et al., 2021). Moreover, scholars have studied discourses related to COVID-19, in

particular, the representations of and discourses about the pandemic (see ViralDiscourse and PanMeMic websites). Related studies are one-way communication oriented, leaving room for studying two-way communication discourses, such as doctor-patient interactions regarding the COVID-19 consultation. Indeed, the COVID-19 consultation, to my best knowledge, is not explored in terms of discursive practice.

China is leading the field in terms of digitalization of healthcare (Milcent, 2018). Many e-healthcare platforms in China provide OMC services. The OMC services include medical agendas such as problem presentation, history taking, verbal examinations, diagnoses, treatment recommendations, advice-giving, and prescriptions; the doctors involved also contributed to OMCs work in hospital offline (for details about OMCs in China see Zhang, 2021). In addition, the online mode of medical consultation was dominated by text-based communication, such as sending WhatsApp messages (see Zhang, 2022). At the beginning of the outbreak of COVID-19, many e-healthcare platforms in China set up a "COVID-19 consultation section" for Chinese people at home and overseas to consult doctors about this disease, as well as about health problems that can be possibly related to the infection. This study thus examines the COVID-19 OMC texts from a discourse analysis perspective, aiming at exploring the discourse features of COVID-19 OMC interactions between doctors and inquirers in terms of thematic and sequential features.

2. Data and methods

OMC texts were selected from two widely used Chinese OMC apps on which text-based OMCs are archived. The OMC texts are publicly viewable rather than password protected. These websites do not prohibit the use of the publicly posted OMC texts for academic purposes. The name of each website has been anonymized in this study in order to protect the privacy of the inquirers and the doctors. The use of the OMC texts obeys the checklist of Internet-specific ethical considerations (see Markham & Buchanan, 2012). Doctors' and inquirers' personal information is not disclosed in examples presented in the present paper.

The data selection criteria include: (1) the consultation must concern whether or not the inquirer or their family is infected by COVID-19; (2) the interaction of the consultation includes more than 4 turns, for the sake of

interactivity (Anesa & Fage-Butler, 2015); (3) if the same doctor is involved in more than one consultation, only one of the consultations is selected, for the sake of diversity; (4) the consultation is initiated within 2020; (5) repeated OMC texts are excluded. Considering that related texts are numerous, and that they are posted on mobile phone apps, which requires manual collection, the first 60 OMC texts posted on each platform that met all the criteria were selected. In total, 120 OMC texts were collected.

The data was examined bottom-up through a qualitative content analysis method from a discourse-analysis perspective. This study aims to find out (1) what are thematic features of COVID-19 OMC inquirers' messages; (2) what are thematic features of the doctors' messages; and (3) what are the sequential features of the inquirer-doctor interaction.

To address the first two research questions presented in the last paragraph, the present study adopted inductive category development procedure (Mayring, 2000) to code 30 OMC texts; then it proposed coding categories that were used to code the rest data. When the preliminarily proposed category did not cover some content, new categories were added or old categories were revised. One year later, the OMC texts were coded again by the same coder. Then, intra-rater reliability was tested; that is, we conducted a comparison of the reliability measures from the coder performed on two occasions (one year time span). The reliability is 0.97 which indicates high coding consistency (Holsti, 1969). Based on the coding, inductive categories were created. After this, themes were established. In addition, this study adopted sequence analysis to address the third research question.

3. Findings

3.1. Discursive features of the turn

3.1.1. The content of the inquirer's turn

As is shown in Table 1, themes of the inquirer's turn content are concluded such as: communicative communication, COVID-19-related consultation, and general medical consultation. The frequency and percentage of the related categories are presented in Table 1. Communicative communication refers to content that involves no medical consultation; such communication is socially oriented and toned with affect, which can achieve affective commitment, generating closeness between the doctor and the patient (see

Burnard, 2004). Communicative communication in this study is categorized as thanking, negative-emotion expression, greeting, acknowledgment (that is, recognizing the doctor's performance), caring about the doctor, blessing the doctor, and closing (i.e., responding to the doctor's closing message, e.g., "Bye"). The examples of each communicative communication category are presented in Table 2.

COVID-19-related consultation refers to content that involves (1) COVID-19-screening-related information, such as temperature, location, going-out information, contact history, travel history, and the condition of companions or families, (2) the need for COVID-19 diagnosis (i.e., inquiring about whether infected or not), (3) COVID-19 precautions (e.g., wearing a mask when going out and avoiding being around people), (4) inquiry about COVID-19 related scientific knowledge, and (5) inquiry about COVID-19 testing related information (e.g., asking about whether a local hospital provides nucleic acid testing service and how much is nucleic acid testing). The examples of sub-categories of each COVID-19-related consultation category are shown in Table 3.

General medical consultation refers to content that involves (1) problem description, (2) response to the doctor's message (e.g., answering the doctor's questions, adding more information or further inquiry based on the doctor's message, accepting the doctor's recommendation, and confirming whether the doctor's message is correctly understood), (3) giving information on healthcare history (e.g., medical history, taking-medicine information, medical tests results, and previous medical consultation experience, including online medical consultation), (4) inquiry about medical advice, (5) inquiry about diagnosis related issues, (6) giving demographic information (e.g., age and gender), (7) semi-expert presentation (i.e., self-diagnosis and confirming whether the inquirer's opinion on the causes of the health problems is correct), (8) daily life description (e.g., lifestyle and workload), (9) inquiry about medicine related knowledge (e.g., inquiring whether certain medicine is sold in drug stores), (10) inquiry about non-COVID-19-related scientific knowledge. The examples of sub-categories of each general medical consultation category are shown in Table 4.

Theme	Category	Frequency	Percentage (out of 120)
Communicative communication	Thanking	53	44.2%
	Negative-emotion expression	51	42.5%
	Greeting	47	39.2%
	Acknowledgement	8	6.7%
	Caring	3	2.5%
	Blessing	1	0.8%
	Closing	1	0.8%
COVID-19-related consultation	Giving COVID-19 screening related information	98	81.7%
	Need of COVID-19 diagnosis	88	73.3%
	Giving information on COVID-19 precautions	25	20.8%
	Inquiry about COVID-19 related scientific knowledge	23	19.2%
	Inquiry about COVID-19 testing related information	4	3.3%
General medical consultation	Problem description	98	81.7%
	Response to the doctor's message	96	80.0%
	Giving healthcare history	64	53.3%
	Inquiry about medical advice	41	34.2%
	Inquiry about diagnosis	16	13.3%
	Giving demographics	12	10.0%
	Semi-expert presentation	9	7.5%
	Daily life description	9	7.5%
	Inquiry about medicine related knowledge	3	2.5%
	Inquiry about non-COVID-19-related scientific knowledge	1	0.8%

Table 1. Content of the inquirer's turn.

Theme	Category	Example
Communicative communication	Thanking	"Thank you very much."
	Negative-emotion expression	"It's not COVID-19, isn't it? So scared."
	Greeting	"Hello."
	Acknowledgement	"You've been working so hard."
	Caring	"Hope you can take care during the pandemic."
	Blessing	"Wish you good health and happy spring festival."
	Closing	"Bye bye."

Table 2. Examples of communicative communication categories in the inquirer's messages.

THEME: COVID-19-related consultation		
Category	**Sub-category**	**Example**
Giving COVID-19 screening related information	Degrees of body temperature	"I took my temperature at 8:00 pm yesterday and it was 37.4°C."
	Location	"I'm in Wuhan city."
	Going out information	"I went to the downtown by Uber."
	Contact history	"I don't know whether there's a close contact with COVID-19 patients."
	Travel history	"I took the high-speed rail to Beijing and then fly to Hong Kong on February 7th."
	The condition of companions or families	"Someone in the family has a bad cough."
	The local epidemic risk level	"No new cases in this city within 40 days."
	Possible source of infection	"My colleague was quarantined three days ago. Today, I went to his office to get some documents on his desk, touched the door handle, and printed the documents in his office."
	Nucleic acid testing-related information	"The nucleic acid results may be not available until tomorrow"
Need of COVID-19 diagnosis	/	"Am I infected with COVID-19 disease?"
Giving information on COVID-19 precautions	Mask-related information	"I took off my mask on the train once."
	Personal protective measures	"I always wear a mask when I go out and wash my hands when I come back."
Inquiry about COVID-19 related scientific knowledge	Inquiry about the infection risk	"I am a recovered COVID-19 patient. Now I'm a volunteer, could I be infected with COVID-19 again?"
	Inquiry about the need for a nucleic acid test	"Do I need to take a nucleic acid test?"
	Inquiry about the need for quarantine	"Should I put myself into quarantine?"
	Inquiry about body temperature related issues	"Is COVID-19 fever persistent or intermittent?"
	Inquiry about coughing symptoms of the COVID-19 patient	"What does a COVID-19 Cough sound like?"
Inquiry about COVID-19 testing related information	Inquiry about the availability of nucleic acid test in the locality	"Is there any hospital that provides COVID-19 diagnostic test?"
	Inquiry about COVID-19 related expense	"What's the cost of the test?"

Table 3. Examples of COVID-19-related consultation sub-categories in the inquirer's messages.

THEME: General medical consultation		
Category	**Sub-category**	**Example**
Problem description	/	"Now it's just a headache, stuffy nose, and sometimes an itchy throat"
Response to the doctor's message	Answering questions	"I didn't experience discomfort."
	Adding more information or further inquiry related to the message	Doctor: "At present, nucleic acid test is required for hospitalization." Inquirer: "I don't seem to have heard of it. Is it a nationwide policy?"
	Accepting the doctor's recommendation	Doctor: "You should have a low-fat low-salt diet. And drink more water." Inquirer: "Ok, thank you."
	Confirming whether the doctor's message is correctly understood	"Did you mean if the person I met is not infected with COVID-19 then I'm fine?"
Giving healthcare history	Medical history	"I have chronic pharyngitis."
	Taking-medicine information	"I took cephalosporin for five days."
	Results of medical tests	"I did a blood test and it's fine."
	Previous medical consultation experience	"I went to hospital for examination. The doctor suggested hospitalization for treatment."
Inquiry about medical advice	Inquiry about medicine-related issues	"What medicine should I take?"
	Inquiry about medical-care related issues	"Should I go to hospital?"
Inquiry about diagnosis related issues	Inquiry about seriousness of the problem	"Is it serious?"
	Asking for a diagnostic result	"What's the problem?"
Giving demographic information	Age	"I'm 30 years old."
	Gender	"Male."
Semi-expert presentation	Self-diagnosis	"I think I got a cold."
	Inquiry about whether the inquirer's speculation about the cause of the problem is correct	"My menstrual period is approaching. Does it cause the decrease in immunity which results in the bad cough?"
Daily life description	Work related information	"I have a heavy workload."
	Lifestyle	"I often stay up late."
Inquiry about medicine related knowledge	Inquiry about whether the medicine recommended by the doctor is sold at drugstores	"Is the medicine sold at drugstores?"
Inquiry about non-COVID-19-related scientific knowledge	Inquiry about the influence of frequent CT scans	"I heard that frequent CT with short intervals can cause significant harm to the body. Is it right?"

Table 4. Examples of general medical consultation sub-categories in the inquirer's messages.

3.1.2. The content of the doctor's turn

As is shown in Table 5, themes of the doctor's turn content are the same as that of the inquirer's. The frequency and percentage of each category are

presented in Table 5. The theme of "Communicative communication" is categorized as (1) greeting, (2) affective response (i.e., comforting or empathizing), (3) thanking, (4) pre-consultation communication (i.e., informing the inquirer that his/her condition is known, the inquirer's message has received, or asking the inquirer to wait for a moment), (5) response to thanking (e.g., "You are welcome."), (6) blessing, (7) self-promotion (see Zhang, 2021 for more details) (i.e., asking the inquirer to give positive comments after the consultation, encouraging the inquirer to keep contact, and publicizing the doctor's online consulting room), (8) expectation (i.e., hoping the consultation is helpful to the inquirer), (9) apologizing (i.e., apologizing for keeping the inquirer waiting), (10) closing (i.e., closing the consultation by saying "Goodbye" or "Goodnight"), and (11) caring. The examples of sub-categories of each communicative communication category are shown in Table 6.

COVID-19-related consultation refers to content that involves (1) inquiry about COVID-19 screening related information, such as contact history, coughing/sputum condition, and confirmed or suspected COVID-19 cases, (2) providing COVID-19-related medical advice, such as taking a nucleic acid test, self-quarantine, and wearing a mask, (3) providing COVID-19-related medical explanation, such as COVID-19 typical symptoms and diagnostic criteria, (4) inquiry about temperature-taking information (i.e., which kind of thermometers the inquirer used and whether the inquirer wore a lot of clothes when taking temperature), and (5) inquiry about whether nucleic acid testing is available in the locality. The examples of sub-categories of each COVID-19-related consultation category are shown in Table 7.

General medical consultation refers to content that involves (1) providing non-COVID-19-related suggestions, such as taking certain medicine and adopting healthy lifestyle, (2) speculative diagnosis, (3) answering to the inquirer's questions, (4) providing non-COVID-19-related medical explanation for, such as, the speculative diagnosis, the symptoms, and the suggestions, (5) inquiry about healthcare history, such as medication, medical history, and medical examination results, (6) formulation of the inquirer's problem description, (7) inquiring about the inquirer's living conditions, (8) medical examination (i.e., oral examination and asking the inquirer to take some pictures for the purpose of diagnosis), (9) inquiry about allergic history, (10) feedback elicitation (i.e., asking about whether the inquirer understands what the doctor said, whether the inquirer has any questions, and whether the doctor understood the inquirer's problem description

correctly), (11) giving information on prescription medicine service that the e-healthcare platform provides, (12) inquiry about the local healthcare conditions (i.e., asking about whether it is convenient to buy medicines or to go to hospital for examination in the locality), (13) inquiry about demographic information, such as age, gender, weight, and height. The examples of sub-categories of each general medical consultation category are shown in Table 8.

Theme	Category	Frequency	Percentage
Communicative communication	Greeting	104	86.7%
	Affective response	57	47.5%
	Thanking	38	31.7%
	Pre-consultation communication	29	24.2%
	Response to thanking	26	21.7%
	Blessing	23	19.2%
	Self-promotion	16	13.3%
	Expectation	15	12.5%
	Apologizing	12	10.0%
	Closing	2	1.7%
	Caring	1	0.8%
COVID-19-related consultation	Inquiry about COVID-19 screening related information	72	60.0%
	COVID-19-related medical advice	39	32.5%
	COVID-19-related medical explanation	39	32.5%
	Inquiry about temperature-taking information	8	6.7%
	Inquiry about whether nucleic acid testing is available	1	0.8%
General medical consultation	Non-COVID-19-related suggestions	86	71.7%
	Speculative diagnosis	80	66.7%
	Answering to questions	73	60.8%
	Non-COVID-19-related medical explanation	68	56.7%
	Inquiry about healthcare history	29	24.2%
	Formulation of the problem description	21	17.5%
	Inquiring about living conditions	14	11.7%
	Medical examination	12	10.0%
	Allergic history	10	8.3%
	Feedback elicitation	4	3.3%
	Information on prescription medicine service	3	2.5%
	Inquiry about the local healthcare conditions	1	0.8%
	Inquiry about demographic information	1	0.8%

Table 5. Content of the doctor's turn.

THEME: Communicative communication		
Category	**Sub-category**	**Example**
Greeting	/	"How do you do?"
Affective response	Comforting	"You can rest assured."
	Empathizing	"I understand how you feel."
Thanking	/	"Thank you."
Pre-consultation communication	Informing the inquirer that their condition is known	"I have read your message and known your condition."
	Informing the inquirer that their message has received	"Your message is received."
	Asking the inquirer to wait for a moment	"Please wait a moment."
Response to thanking	/	"You are welcome."
Blessing	/	"Wishing you a speedy recovery"
Self-promotion	Asking the inquirer to give positive comments	"Could you please give me positive comments?"
	Encouraging the inquirer to keep contact	"Feel free to contact if needed."
	Publicizing the doctor's online consulting room	"If my service is helpful, please follow my online consultation room and you can forward it to friends and families."
Expectation	/	"I hope my responses are helpful."
Apologizing	/	"I'm sorry for keeping you wait."
Closing	/	"Goodbye"
Caring	/	"Take care."

Table 6. Examples of communicative communication sub-categories in the doctor's messages.

THEME: COVID-19-related consultation		
Category	**Sub-category**	**Example**
Inquiry about COVID-19 screening related information	Inquiry about COVID-19 related symptoms	"When coughing, is there phlegm??"
	Inquiry about contact history	"Have you had a history of close contact with the infected?"
	Inquiry about confirmed or suspected COVID-19 cases	"Has your colleague been diagnosed with COVID-19?"
	Inquiry about the inquirer's location	"Where are you now?"
	Inquiry about the length of the symptoms	"How long has the cough been?"
	Inquiry about travel history	"Have you been to Hubei province in the last 2 weeks?"
	Inquiry about the condition of people around	"How about the condition of your families?"
	Inquiry about the local epidemic risk level	"Is the local epidemic serious?"
	Inquiry about the precautions	"Whether you wear a mask when you go out"
	Inquiry about going out related information	"Have you been out in the last two weeks?"
	Inquiry about emotion related information	"Are you experiencing anxiety and irritability?"
	Inquiry about quarantine related information	"You are under quarantine, aren't you?"
COVID-19-related medical advice	Take precautions	"Wear a mask when going out and wash your hands frequently"
	Self-quarantine	"Considering this condition you need self-quarantine for more than 14 days."
	Taking a nucleic acid test	"I suggest you take a nucleic acid test"
COVID-19-related medical explanation	COVID-19 typical symptoms	"The typical symptoms are mainly fever, cough, and fatigue."
	Diagnostic criteria	"At present, infection cannot be identified by clinical signs, but mainly through nucleic acid testing."
	Route of transmission	"It is mainly transmitted by airborne droplets."
	Pathological mechanism	"COVID-19 is the inflammation of the lung interstitium."
	Probability of infection	"The probability of reinfection is very low, because COVID-19 patients after recovery have antibodies."
Inquiry about temperature-taking information	Inquiry about the kinds of thermometers	"Which kinds of thermometer you used?"
	Inquiry about the clothes worn by the inquirer when taking temperature	"Whether you wear a lot of clothes when taking the temperature?"
Inquiry about whether nucleic acid testing is available	/	"Whether nucleic acid testing is available locally?"

Table 7. Examples of COVID-19-related consultation sub-categories in the doctor's messages.

THEME: General medical consultation		
Category	**Sub-category**	**Example**
Non-COVID-19-related suggestions	Treatment recommendation	"You can add one more medicine–paracetamol, caffeine, artificial cow-bezoar, and chlorphenamine maleate capsules."
	Suggestions on lifestyle	"Drink plenty of water appropriately to promote metabolism and toxin excretion"
Speculative diagnosis	/	"For now, you have a typical viral upper respiratory tract infection."
Answering to questions	/	Inquirer: "Do these kinds of medicines work?" Doctor: "These are not very suitable for you"
Non-COVID-19-related medical explanation	The speculative diagnosis	"Your problems are caused by a cold, as there are currently no confirmed cases in Baotou city."
	The inquirer's symptoms	"You experience chest chills because you are anxious."
	The doctor's treatment recommendation	"The treatment of viral upper respiratory tract infection is mainly symptomatic treatment"
	The reasons for keeping the inquirer wait	"Considering your condition, you can take compound anti-cold preparations that relieve a variety of cold symptoms, such as Compound aminophenolamine capsules or tablets. Such medicine can taking medication can relieve fever, cough, headache, runny nose, etc., and shorten the course of the disease."
	Body temperature	"The body temperature of a healthy person fluctuates throughout the day. If the axillary temperature is below 37.3℃ after taking the temperature for five minutes, then it's not fever."
Inquiry about healthcare history	Medication	"Did you only eat cephalosporin"
	Medical history	"Have you ever had this kind of health problems before?"
	Medical examination results	"Did you take any medical examination?"
Formulation of the problem description	/	"Your main symptoms are low-grade fever, feeling warm in your chest, a little dry and itchy throat, and not working well with medication"
Inquiring about living conditions	Sleep conditions	"Do you often stay up late?"
	Diet	"Have you eaten too much spicy food recently?"
	Smoking or not	"Do you smoke?"
Medical examination	Oral examination	"How about blood pressure?"
	Asking the inquirer to take some pictures	"Is it convenient to send me a picture of the posterior pharyngeal wall? I need to see how your throat is doing. (A picture is sent to the inquirer) Your picture would be roughly like this, especially the places where I draw circles."
Allergic history	/	"Are you allergic to any medications?"
Feedback elicitation	Asking about whether the inquirer understands the doctor's words	"Did I make it clear?"
	Asking about whether the inquirer has any questions	"Any questions?"
	Confirming whether the doctor understood the inquirer's problem description correctly	"By 'neck pain', did you mean you have a sore throat?"
Information on prescription medicine service	/	"After the prescription is issued, you can choose whether or not to buy the medicine via this platform."
Inquiry about the local healthcare conditions	/	"Is it convenient to go to hospital taking some examinations in the locality?"
Inquiry about demographic information	/	"How old you are, your gender, your height, and how much weight you are?"

Table 8. Examples of general medical consultation sub-categories in the doctor's messages.

3.2. Discursive features of the interactive sequence

Based on observation of the data, the COVID-19 e-consultations involve three stages: initiation, ongoing, and near closing. By "near closing", it means that the number of medical consultation categories are declining and closing marks, such as blessing and expressing expectation, occur. Moreover, the third stage is named as "near closing" instead of "closing" because usually the last turn is sent by the doctor and still involves some medical consultation categories, such as suggestions, explanation, and diagnosis. That said, these categories occur less frequently in the near closing stage than in the ongoing stage. As it is the inquirer who initiates the consultation when it comes to online medical consultation, the first turn is always initiated by the inquirer. As is shown in Table 9, in the initiation stage, the content of the inquirer's turn usually involves questions, information that may be helpful for the consultation, problem description, greeting, and negative-emotion expression; the content of the doctor's turn usually includes greeting, question(s), medical explanation, speculative diagnosis, thanking, medical or regular suggestions, pre-consultation communication (for details see the last section), affective response, answering questions, formulation of the inquirer's problem description, medical examination, apologizing for keeping the inquirer waiting. In the ongoing stage, the content of the inquirer's turn usually involves (1) response to the doctor's message, (2) repeating the questions, information, or problem that are presented in the initiation stage, (3) new questions, and (4) negative-emotion expression. The content of the inquirer's turn in the near closing stage is the same as that in the ongoing stage. That said, the "new questions" category occurs less frequently in near closing stage than in ongoing stage, and "thanking" occurs more frequently in near closing stage than in ongoing stage. Besides, "negative-emotion expression" category occurs in all of the three stages, decreasing progressively.

As is shown in Table 9, the content of the doctor's turn in ongoing stage is similar to that in initiation stage except that "greeting", "question(s)", "thanking", "pre-consultation communication", "medical examination", and "apologizing" usually do not occur in ongoing stage. The content of the doctor's turn in near close stage is the same as that in ongoing stage except that "formulation of the problem description" is not involved in the last stage. In line with "negative-emotion expression", "affective response" presents in all of the three stages and most frequently appears in ongoing stage. The frequency and percentage of the content are presented in Table 9.

Stage	Participant	Content	Frequency	Percentage
Initiation	Patient	Question(s)	101	84.2%
		Providing information	98	81.7%
		Problem description	97	80.8%
		Greeting	47	39.2%
		Negative-emotion expression	30	25.0%
	Doctor	Greeting	104	86.7%
		Question(s)	76	63.3%
		Medical explanation	45	37.5%
		Speculative diagnosis	41	34.2%
		Thanking	34	28.3%
		Suggestions	33	27.5%
		Pre-consultation communication	28	23.3%
		Affective response	24	20.0%
		Answering to questions	23	19.2%
		Formulation of the problem description	14	11.7%
		Medical examination	12	10.0%
		Apologizing	10	8.3%
Ongoing	Patient	Response to the doctor's message	88	73.3%
		Repeating the question(s)/information/problem	33	27.5%
		New questions	29	24.2%
		Negative-emotion expression	19	15.8%
		Thanking	15	12.5%
	Doctor	Suggestions	58	48.3%
		Medical explanation	46	38.3%
		Answering to questions	44	36.7%
		Speculative diagnosis	38	31.7%
		Affective response	36	30.0%
		Blessing	14	11.7%
		Formulation of the problem description	12	10.0%
		Expectation	8	6.7%
		Self-promotion	7	5.8%
Near Closing	Patient	Response to the doctor's message	58	48.3%
		Thanking	39	32.5%
		Repeating the question(s)/information/problem	21	17.5%
		New questions	17	14.2%
		Negative-emotion expression	11	9.2%
	Doctor	Answering to questions	41	34.2%
		Suggestions	35	29.2%
		Affective response	19	15.8%
		Medical explanation	13	10.8%
		Self-promotion	10	8.3%
		Blessing	9	7.5%
		Speculative diagnosis	9	7.5%
		Expectation	3	2.5%

Table 9. Content of the interactive sequence.

The stages of the COVID-19 e-consultations, their order, and the related content are similar to that of the regular face-to-face medical consultation: "opening", "problem presentation/complaint", "history taking", "physical examination", "diagnosis", "treatment recommendation", and "closing" (Heritage & Stivers, 1999). What is different is that content related to different phases can occur within one stage in the COVID-19 OMCs. For example, the initiation stage involves content related to "opening", "problem presentation", questions in relation to "history taking", examination, speculative diagnosis, and suggestions in relation to "treatment recommendation", as is shown in Table 9. Besides, content related to a certain phase can be involved in different stages in the COVID-19 e-consultations; for example, suggestions related to treatment recommendation occur in the three stages. In a word, there are no boundaries between each phase in the COVID-19 OMCs.

While the discursive features of the interactive sequence of the COVID-19 OMCs bear similarity to those of the regular face-to-face medical consultation, the interaction of COVID-19 OMCs is characterized by OMC-specific features, such as apologizing for keeping waiting, pre-consultation communication, and self-promotion (for details see Zhang, 2022). In addition, as is shown in Table 9, affective interactions between the inquirers and the doctors occur in each of the three stages, which is discussed in the following section.

4. Discussion and conclusion

In most of the consultation cases, the inquirers provide the information needed for COVID-19 screening, and some inquirers provide the information related to COVID-19 protection (see Table 1). The information is usually related to the typical symptoms, screening factors, and protection requirements of COVID-19 that are seen in public health publicity or science popularization on the COVID-19 disease. This indicates that the public, when consulting about new infectious diseases, may be affected by the health publicity and science popularization on the disease and the epidemic situation. It is worth noting that most of the inquirers proactively provide their temperature conditions (70% consultations out of the dataset present a body temperature of a specific degree and 32% consultations present descriptions of body temperature), as fever is a typical symptom of

COVID-19 infection. However, they have inaccurate understanding or are uncertain about fever. For example, many inquirers regard a body temperature of 37 degrees by an axillary thermometer, rather than 37.3 degrees, as the boundary of having or not having a fever. Normal body temperature ranges from 97.5°F to 98.9°F (36.4°C to 37.2°C) and it tends to be lower in the morning and higher in the evening (stated by Johns Hopkins Medicine, one of the leading medical education and research institutions). Although "fever" is a commonly used medical word in everyday conversation, it seems there is a disparity between the public's perception and the clinical definition of fever (Gittelman et al., 2004). Health professionals should not assume that a patient or a caregiver understands frequently used medical words, such as fever. In fact, some inquirers in the dataset explicitly raise questions related to body temperature or fever, hoping to receive a scientific explanation, and others inquire about which temperature measurement method is reasonable. Although the doctors proactively give scientific explanations for the typical symptoms of COVID-19, few provide explanations regarding the temperature issue. In view of this, in public health promotion and health science popularization, it is necessary to provide more precise communication not only about a new disease but also about commonly utilized medical knowledge, such as how to measure body temperature and what degree is considered a fever while using different kinds of thermometer. Medical educators would enhance the awareness of medical students in popularizing certain medical knowledge, helping them understand misunderstandings of patients and their families about some health issues, so as to improve communication efficiency and provide a patient-centered healthcare service.

While previous studies show that patients seldom express emotion directly in medical consultation (Zimmermann et al., 2011; Suchman et al., 1997), the current study finds that almost half of the consultations present explicit negative emotional expressions by the inquirers and such expressions occur in all of the three stages (see Table 3). This finding can be associated with the communicative features of the online mode of medical consultation. That is, e-consultation is patient active (Lu & Zhang, 2019) and sees more balanced power distribution (Yellowlees et al., 2015), which contribute to affective interaction in OMC communications (see Zhang, 2022). In addition, the frequent explicit negative emotional expressions can also be associated with the nature of the disease – an emerging infectious disease, as this kind of disease can cause negative emotions among the public, such as

fear, anxiety, sadness, and anger (Jin et al., 2016). Intriguingly, the doctors can pay attention to the affective aspect of the inquirers' messages in the COVID-19 OMC discourse through affective responses, although it is acknowledged that the affective dimension of doctor-patient interactions is often treated as less salient than the epistemic and deontic dimensions (see Stevanovic & Peräkylä, 2014).

In addition, regarding communicative communication, the communicative communication by the doctors is more frequent than that by the inquirers, such as greeting and blessing, as is shown in Tables 1 and 2. This can be associated with the commodification of the e-healthcare platforms from which the data were collected. In particular, there is an evaluation system on the platforms, which can facilitate the establishment of a "good doctor" image so as to attract more "visits" (Zhang, 2022). The frequent occurrence of greeting and blessing from the perspective of the doctors may help build a friendly image that closes the distance between the doctors and the inquirers, thus contributing to receiving positive comments. Due to the evaluation system, doctors working for OMC platforms often do self-promotion to elicit positive comments (see Zhang, 2021, 2022). This is also seen in the COVID-19 consultations collected for this study. While the self-promotion act indicates the shift of power from doctors to e-patients (Zhang, 2021), another interactive feature in the COVID-19 e-consultation also shows the power shift. That is, the doctors frequently answer the inquirers' questions (and of course, that the inquirers frequently ask questions) and the answering-questions category occurs in each of the three stages (see Table 3). It is widely acknowledged that due to power asymmetry doctors dominate the consultation through asking questions and patients are passively involved (see Heath, 1992; Chen & Li, 2011; Niu et al., 2014). However, such power asymmetry is not seen in my dataset.

In conclusion, this study examines the COVID-19 OMC texts from a discourse analysis perspective, in particular analyzing the content of the inquirers' messages and of the doctors' messages, and the consultation stages. Findings show that while there is content in relation to COVID-19 related consultation and general medical consultation, content in relation to communicative interaction, rather than medical consultation, is also frequently presented and such content occurs in each of the three stages. What is more noteworthy is that affective interaction (i.e., negative-emotion expression by the inquirers and affective response by the doctors), self-promotion, greeting, thanking, and blessing frequently occur in the COVID-

19 OMCs. This may contribute to relationship-centered communication as well as constructing a harmonious atmosphere in the OMC context. The current study facilitates a better understanding of OMC discourse in the context of COVID-19. It could also be useful for health professionals when providing healthcare services in other contexts, especially when access to face-to-face medical consultations is difficult and the online mode of medical consultation is inevitable. It also provides some implications in terms of health publicity and science popularization.

Funding

The work was supported by Humanities and Social Science Fund of Ministry of Education of China (Project No.: 23YJCZH310; Title: Affective Practice in Online Medical Consultations about Major Infectious Disease), R&D Program of Beijing Municipal Education Commission (Project No.: SM202311232003; Title: Discourse Analysis of Affective Interactions in Online Medical Consultations during the COVID-19 pandemic), and Beijing Information Science and Technology University (Project No.: 2021YJPY234; Title: The Doctor-Patient Relationship in Online Medical Consultations in China: A Discourse Analysis Perspective).

Acknowledgements

I would like to thank the editor Prof Ruth Breeze and the anonymous reviewers for handling this paper and for helping me improve it, as well as for their prompt responses.

Article history:
Received 19 January 2024
Received in revised form 7 March 2024
Accepted 8 March 2024

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